

**SIEMENS**

# **Network ID Camera**

**SP**

## **Troubleshooting Guide**

**NIC2-2**

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# Service Manual

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# NIC2-2

# Network ID Camera

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### **PLEASE NOTE**

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# 1. General information

## 1.1 ESD

### ! CAUTION

This equipment includes parts and assemblies sensitive to damage from electrostatic discharge. Use caution to prevent damage during all service procedures..

### 1.1.1 Overview

Electrostatic discharge (ESD) is a primary source of

- Product downtime
- Lost productivity
- Costly repair

While we cannot feel a static charge of less than 3,500 volts, as few as 30 volts can damage or destroy essential component in the electronic equipment. As technology advance, these components will be even more vulnerable to ESD destruction.

Therefore, to maintain and increase productivity and profitability, you must observe ESD guidelines.

Effective ESD control requires the following things.

### 1.1.2 Awareness

Everyone in your organization should be aware of ESD because partial ESD control is no ESD control at all.

Everyone needs to remember that:

- ESD is a primary source of equipment failures and intermittent malfunctions.
- ESD affects productivity and profitability
- ESD can be controlled

### 1.1.3 Action

Everyone from senior management to be evening security crew must observe ESD guidelines.

- If you repair and maintain electronic equipment, always wear grounding straps and work at ESD protected sites.
- If you work around electronic equipment, keep static generators like plastic trash bags away from sensitive components.
- Observe ESD guidelines every day. (See the following sections for special tips).
- Remember, effective ESD control is everyone's responsibility.

### 1.1.4 Every day

- Keep trash away from static-sensitive equipment. Plastic materials, such as plastic foam cups, generate the static electricity that damages or destroys electronic components.
- Look at the label. Static-sensitive components are marked with bright graphic labels. Follow the label directions.

- Spray the carpet. ESD that is generated when you walk over carpet is a major cause of component destruction. In some cases, especially in low-humidity environments, you may need to periodically spray the carpets with an anti static spray that is available at local stores.

### 1.1.5 During maintenance

- Wear a ground strap when you work with static-sensitive components. Always make certain that the clip is attached to a properly grounded, unpainted surface.
- Use a portable ground mat if you cannot repair components at an ESD protected work-station.
- Use protective packaging when you transport components from one area to another. Transparent antistatic bags, available from a variety of manufacturers, shield the components from future damage.

## 1.2 Safety precautions

- Do not operate or repair the ID camera without proper accessories. Add all COVERS before use to prevent mechanical hazards and electrical shock.
- Do not use a damaged POWER CORD. The damaged CORD can cause malfunctions and current leakage or electrical shock.
- If there are any abnormal smell or smoke during operation, de-energize the ID camera immediately and contact authorized personnel for support.
- Do not operate the ID camera in unsafe locations such as outdoors or in wet places. Do not allow liquids, gaseous or solid-state materials to enter the ID camera.
- When doing electrical measurements, use an isolation transformer or leakage current detector in the power line to avoid an electrical shock.
- Double pole/neutral fusing. For continued protection against risk of fire, replace only with same type and rating of fuse.
- Use only original parts from the Parts List to repair the ID camera.

Make sure that the requirements of UL 122 - Splice and Connection - paragraph 13.10 and EN 60 950, section 4.39 are observed. When replacing AC primary components, such as wires, sockets or capacitors, wrap the end of the wire completely around the terminal before soldering.

## 1.3 Specification

Electrical supply:	115 -230 VAC, 50/60 Hz
Power consumption:	25W, max 50W
Mains fuse:	2x1 AT
Dimension:	392 x 352 x 153 mm
Weight:	12,6kg
Operating temperature:	10° - 40° C
Humidity:	20 - 85 % RH non-condensing
Approvals:	EN50082, EN550022, EN61000-3-2, EN61000-3-3, EN 60950, UL 1950 Third Edition, CAN/CSA C22.2 No. 950-95 Third Edition. FCC class B.

## 1.4 Service tools

Use the following tools to repair a Network ID camera:

- Philip Screw Driver size PH2
- TORX Screw Driver size 10
- TORX Screw Driver size 20
- Socket head cap screwdriver 2.0 mm
- Box socket wrench 8.0 mm
- Digital Multimeter: Voltage 5 to 24V
- Resistance 0 to 100 ohm
- GluePrimer, Loctite 770 Polyolefin
- Glue, Loctite 406 Cyanoacrylate
- Nut retentionLoctite 243

To update the firmware or upload or download set-up, computer equipment is needed:

Service Computer: 100% IBM compatible

Hard disk  
VGA Monitor display  
1 RS 232 Serial Interface  
CD Drive or Internet connection  
1 9pin male-female Serial Interface Cable

Service Software: NIC Setup Manager. This programme is needed to upgrade the firmware and to upload and download the set-up. The software can be downloaded from Triacon's homepage. It is also distributen on a CD ROM disk for a minor administration cost.

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## 2. Physical connection

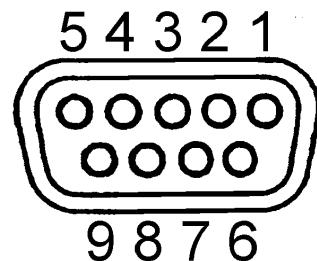
On the back of the Network ID Camera there are four connectors for communication.



### 2.1 The HOST connector

This connector is a female 9-pin DB9 connector. Its pinout is designed with the 9-pin connector used on PC compatibles in mind. If the Network ID Camera is to be connected to a PC compatible computer a pin-to-pin cable with a male connector on one end and a female connector on the other end can be used. If it will be connected to another host computer the following pin description can be used to make your own cable. Note that the name of the pins mentioned is what the pin should be connected to. Thus RxD is really an output from the camera. .

Name	Direction	No
DCD	Out	1
RxD	Out	2
TxD	In	3
DTR	In	4
GND		5
DSR	Out	6
RTS	In	7
CTS	Out	8

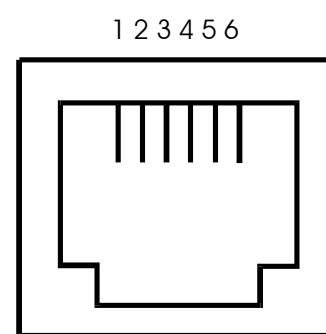


Note that the Network ID Camera do not need any handshake signals to work. It sends out all handshake signals to the host computer but ignores any handshake input. If your host computer also ignores the handshake signals you will only need to connect the ground (pin 5) and the TxD (pin 3).

### 2.2 The AUX connectors

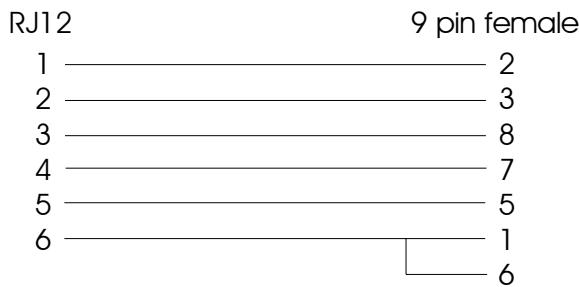
These connectors are of type RJ12 connectors. Note that the name of the pins mentioned is what the pin should be connected to. Thus RxD is really an output from the camera. .

Name	Direction	No
RxD	Out	1
TxD	In	2
CTS	Out	3
RTS	In	4
GND		5
+VDC	Out	6



+VDC is a high level signal out. This signal is intended for setting DCD and DSR if needed.

To adapt the AUX connectors to 9 pin DB9 PC compatible RS232 interface a adapter cable is required



## 2.3 The NET Connector

This connector carries one RS422/485 (software selectable) and one RS485-only communication channel. When using this connector for patient data download only the RS422/485 channel is used in RS422 mode. This channel is called the HOST-RS422 below.

The connector is of the type RJ-45. It was selected because there are a lot of cable and connector material available for this kind of connector as it is also used to build LAN networks of type 10Base-T for personal computers. Normally this way is used to connect cameras to a host computer or when one host computer is connected to more than one camera but it may also be used if the distance between the host computer and camera is too long for RS232.

Next section will describe how to build an RS422 network using commonly available materials made for 10Base-T networks. Below follows the specification of the NET connector that may be needed if other material is used.

The pinout of the NET connector.

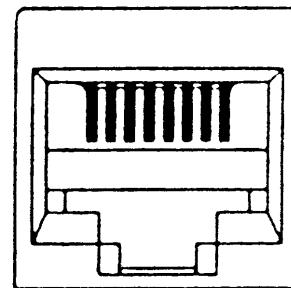
Pin	Used as:	Name
1	+ for the HOST RS422 output	Network Pair
2	- for the HOST RS422 output	Network Pair
3	GND	Network ground
4	+ for the HOST RS422 input and RS485 bi-directional	Network Pair
5	- for the HOST RS422 input and RS485 bi-directional	Network Pair
6	GND	Network ground
7	- external equipment RS485	External equipment pair
8	+ external equipment RS485	External equipment pair

There is a standard colour scheme used by most (all) connector and cable manufacturers, base colour first then the stripe colour.

1	White/Orange
2	Orange/White
3	White/Green
4	Blue/White
5	White/Blue
6	Green/White
7	White/Brown
8	Brown/White

This is a picture with pin numbers of the female MOD8 connector found at the back of the camera.

1 2 3 4 5 6 7 8



Regardless of what is connected where, shielded connectors, patch cables and installation cables should be used. The cable should be a "4 pair STP" category 3 or 5. Unfortunately there does not seem to be any standard name for this equipment that can be referred to when buying. The only common description seems to be that it is the same equipment as is used for 10Base-T networks.

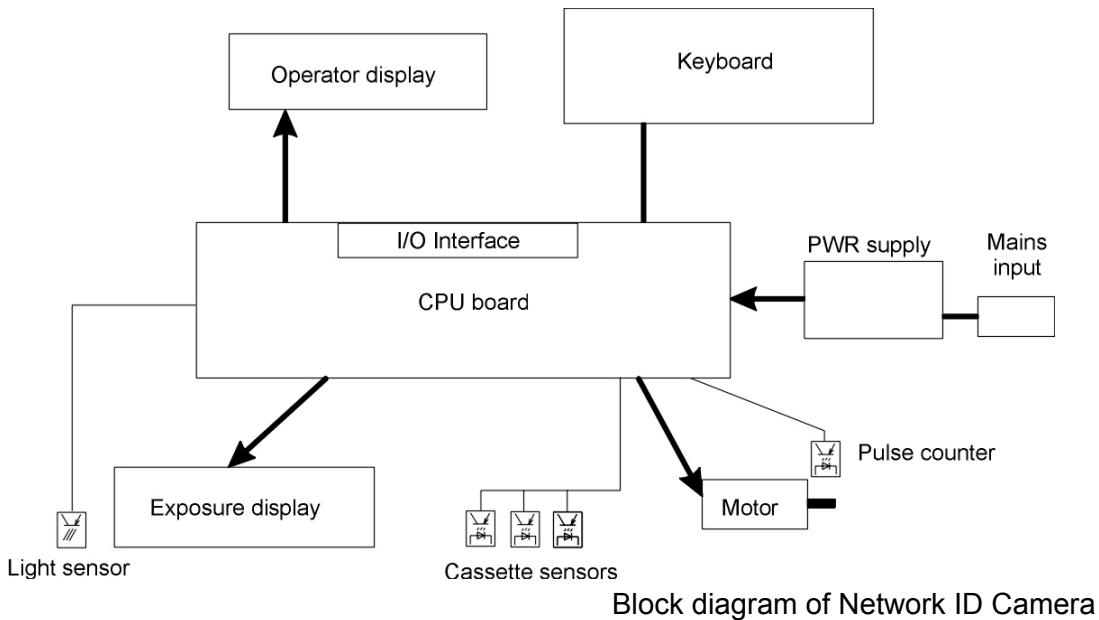
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### 3. Theory guide

#### 3.1 Block diagram

All functions of the ID camera are controlled by the microcontroller on the CPU board.

The controlling firmware is stored in a 512K FLASH memory. All inputs, outputs and drivers for the motor are located on the CPU board. The CPU board is connected to the operator display, exposure display, keyboard and motor sensors. All connectors for external communication are located on the CPU board..



Block diagram of Network ID Camera

#### 3.2 Description of functions

##### 3.2.1 Power supply system

The power system of the ID camera consists of:

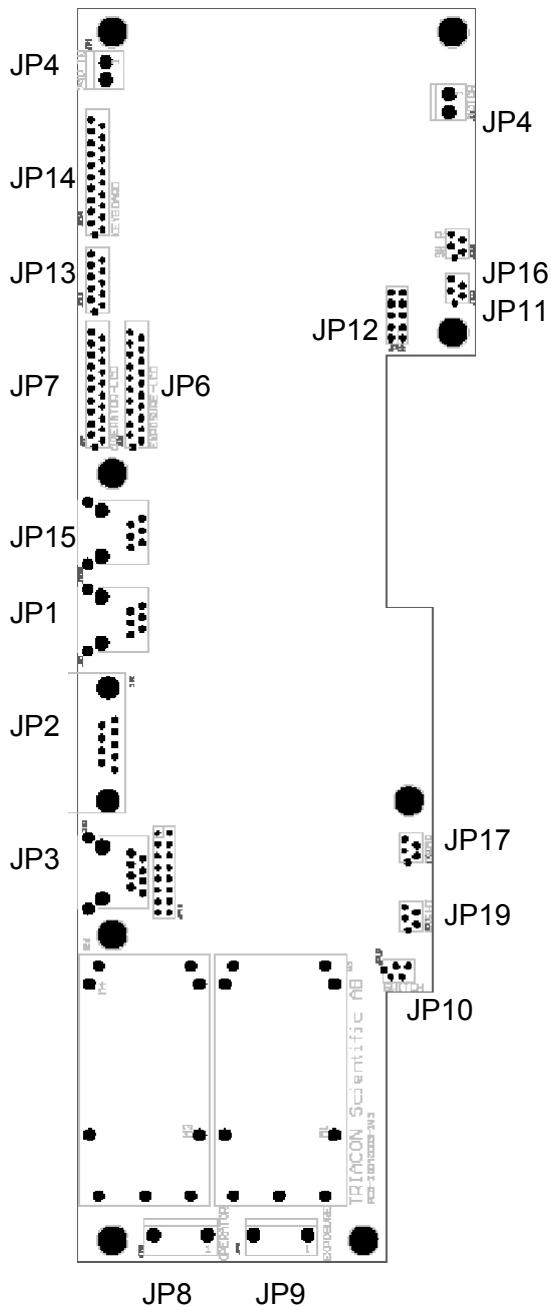
- A mains input module featuring a mains cord connector built together with a mains filter and a fuse holder.
- A mains switch mounted at the back of the camera.
- A switched power supply delivering 24V/50W.

##### 3.2.2 CPU board

The CPU board features:

- A 16 bit microcontroller. Motorola 68HC16.
- 512K of FLASH memory where the program is stored. 16K is used to store a bootstrap program used to download the main program and 16K is used to store the set-up of the camera.
- 256K battery backed-up RAM memory used to store data while operating.
- One RTS.
- Three switched power converters for converting the 24V supply voltage to 5V, 12V and -12V.

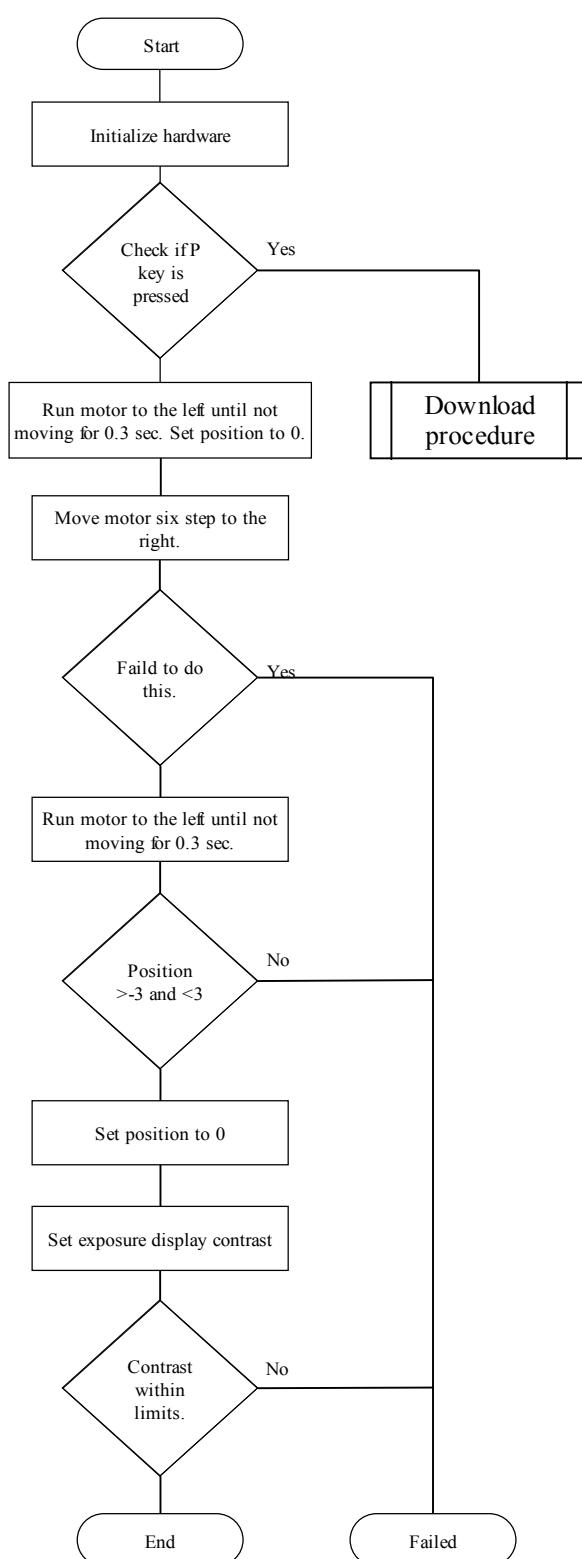
- Two high voltage converters, called inverter, for the background light of the operator- and exposure display. These are a separate boards mounted on top of the CPU board on the left side
- Two RS232 serial ports.
- One RS232/RS422 serial port.



The CPU board is controlling all functions of the ID camera. The following connectors are located on the board.

- JP1 External RJ12 connector. RS232.
- JP2 External 9 pin female D-SUM. RS232.
- JP3 External RJ45 connector. RS232/ RS422
- JP4 24VDC power.
- JP5 Motor.
- JP6 Exposure display
- JP7 Operator display.
- JP8 Power to the back-light of the operator display.
- JP9 Power to the back-light of the exposure display.
- JP10 Left opto sensor board
- JP11 Middle opto sensor board.
- JP12 A connector to the background debug channel of the Motorola 68HC16 CPU. Only used during production.
- JP13 Keyboard adapter board.
- JP14 Keyboard adapter board.
- JP15 External RJ12 connector. RS232.
- JP16 Right opto sensor board.
- JP17 Not used.
- JP18 Jumpers for RJ45 connector.
- JP19 Light sensor.

### 3.2.3 Switch On / Initialize Procedure



Camera status: Mechanic position of the carriage is not known. Camera is energized.

The microprocessor starts the initialization routine. First while still executing the bootstrap program, the P key is checked. If pressed the download procedure will be started.

If not pressed the bootstrap routine will call the main program.

The main program initializes all hardware resources on the CPU board as well as the operator- and exposure display.

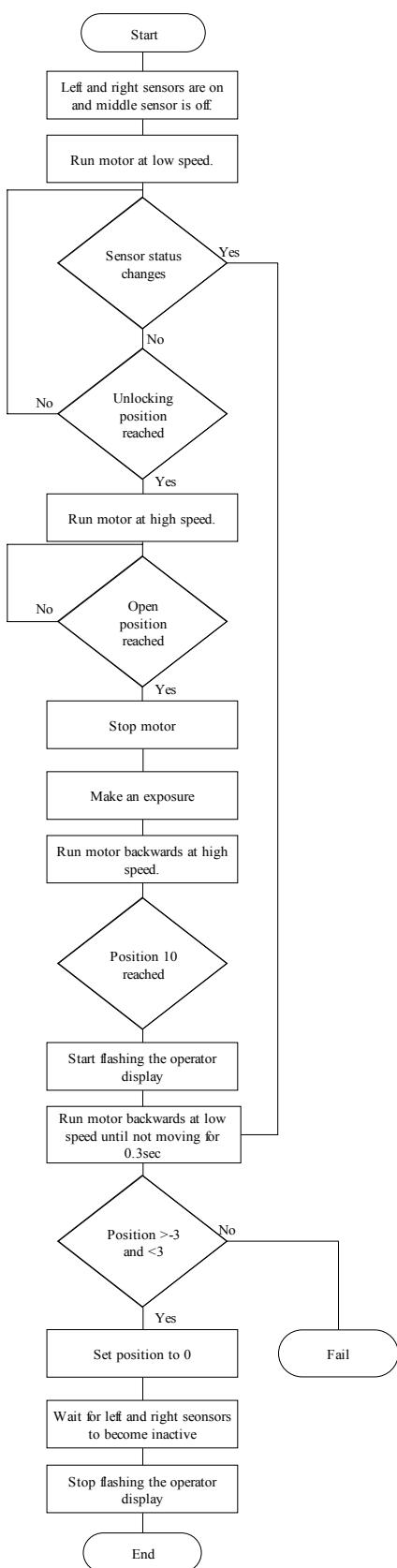
The main program checks if the set-up memory is valid by calculating a check sum. If the check sum does not match the stored value the set-up memory is erased.

The opening unit is run to calibrate the mechanism to find out the left position of the movement area.

The contrast of the exposure display is set.

If calibration of opening mechanism as well as for contrast of exposure display is successful the main picture is displayed and the camera is ready for operation.

### 3.2.4 Opening sequence



Camera status: The opening carriage is positioned in its left position.

The sequence is initialized when the left and right cassette sensors are activated while the middle sensor is not.

First the motor is run to the right at a slow speed until the finger of the carriage has entered the hole of the cassette lid and unlocked the lid. At that point the speed of the motor is increased to full speed.

The motor is run at full speed until the position where the lid is considered opened. At this position the motor is stopped. This position can be changed in the setup of the camera.

The exposure is made by switching on the background light of the exposure display. When the exposure is done the background light is switched off.

The motor is now run at full speed towards its left position until position 10 is reached. At that position the operator display starts flashing and the speed is slowed down. The motor run until no movement is detected for 0.3 seconds.

The motor is now considered being stopped at its left position. The position is now checked. If it is not within -3 to 3 it was not able to reach its left parking position and an error message is generated. If within this range the position is set to 0 and the exposure cycle is finished.

The right and left sensor must both be off before the operator display stops flashing and a new exposure can be made.

During all operations it is checked that the motor is rotating. If no pulses are read from the pulse counter for 0.3s the motor is considered stopped by force and the motor is switched off and an error message generated.

### 3.2.5 Keyboard

The keyboard is a standard 84 keyboard.

The keyboard layout may be changed by replacing the whole keyboard and selecting the appropriate language in the firmware.

### 3.2.6 Operator display.

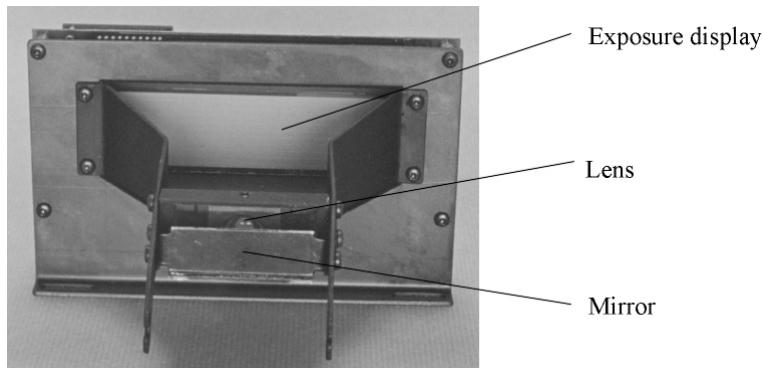
The operator display is a 240 pixel wide and 64 pixel high graphic liquid crystal display (LCD) display with cold cathode fluorescent lamp back-light. The LCD is controlled by the micro-processor on the CPU board. All characters are generated by the microprocessor and this allows the Network ID Camera to show any character on the display in any size. Current firmware provides 256 - 32 characters according to ISO 8859-1 in three sizes.

The back-light is driven by a high voltage and the generator (called inverter) that is located as a small separate board on the CPU board. The life-length of the back-light is between 10,000 and 15,000 hours. Life-length is the number of hours the light can be on until the intensity has decreased to half of the initial intensity. To extend the life length of the back-light it will be switched off automatically when the camera has not been used for an hour and will be switched on again as soon as a key on the keyboard is hit.

The LCD display is protected by a acrylic shield that can be replaced separately. It is not a part of the LCD display but inserted between the LCD unit and the case.

### 3.2.7 Exposure unit.

The main parts of the exposure unit are the display, the lens and a mirror



The display is used to generate the picture that will be printed on the film. It is a 240 pixel wide and 64 pixel high graphic liquid crystal display (LCD) display with cold cathode fluorescent lamp back-light, same type as the operator display. It is fully graphical which means that any picture can be generated, the picture can be mirrored in any direction and the information can be printed either white on black or black on white.

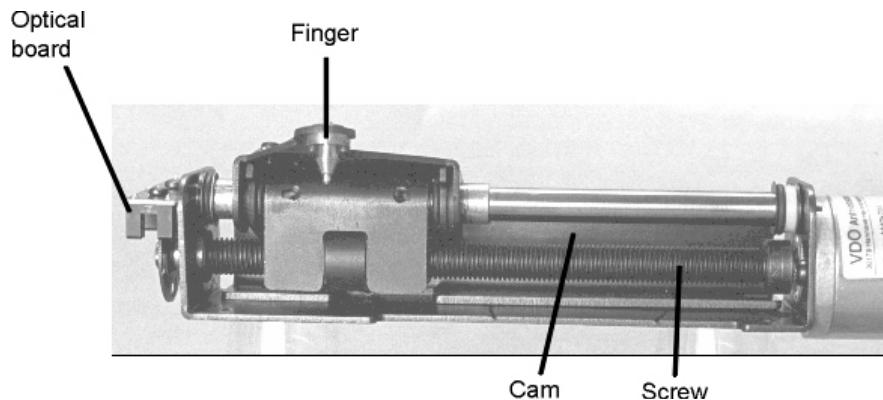
The lens is a specially made for this camera. Both the sides of it has a convex lens and the least convex side should face the display. The size of the picture on the film can be adjusted by moving the lens backwards or forwards. This is though not recommended except in special cases. On the market there are very few cassettes with a window which is shorter then normal. For example there exists a mammography cassette where the window is located on the short side and not on the long which is normal. Because of this there is no room to open the window fully, instead the window is made about 25% shorter. To be able to use this cassette with the Network ID Camera the lens has to be moved. It may also be necessary to put

the lens backwards to decrease the size of the picture even more. When shipped the size and position of the picture is set to work with Kodak cassettes or equivalent.

The mirror is a surface plated mirror. It should not be polished as this will destroy the silver layer and affect the quality of the picture. The mirror can be moved backwards and forwards and tilted. It is important to set the angle correct as if the angle is not 45 degrees the picture will be a trapezoid instead of a rectangle.

### 3.2.8 Opening mechanism

The opening mechanism consists of a motor driving a screw. This screw drives a carriage which glides on a shaft. The carriage has a finger that unlocks the lid and opens the lid. To do this the finger has to move up and down and this is achieved by a cam on the back of the opening mechanism assembly and a ball-bearing mounted on the back of the carriage which rolls on this cam. On the left side of the opening mechanism assembly there is a code disk mounted on the driving screw and a optical switch which is used as a pulse counter.



The opening sequence is described in chapter 2.2.3 and will not be repeated here.

The optical board mounted on the left side of the assembly can be sledded backwards and forwards to adjust the cassette sensing point. This adjustment is described in the Diagnostic chapter. There is no need for any adjustment for the pulse counter.

The only adjustment on the opening mechanism is the position on the cam. The cam can be sledded sidewise to adjust the position when the finger goes down in the lid to unlock it. If this position is set too far to the right the lid may not lock when closing the lid. If the position is set too far to the left the finger may hit the edge of the window. When doing the adjustment it is a good idea to gently press the finger down to get the play in its down position and then move the carriage manually by rotating the screw. Also the setting should be checked with all cassette types used. When the setting is correct, rotate the screw by hand through the phase where the finger goes down and while doing so, push the finger gently upwards to get the play in the upper position. This should be done to check that the carriage can in no way hit the exposure unit.

In the finger there is a pin. There are two kinds of lids on the cassette types the Network ID Camera can work with. One is made of metal with a metal locking mechanism. This lid is used on all or many of Kodak's, Fuji's and Dupont's cassettes. The other is made of plastic with a plastic locking mechanism. The plastic lid is more than 1mm thicker than the metal lid which means that the finger has to reach 1mm deeper when the plastic lid is used. The strength of the spring is such that when the metal lid with its metal locking mechanism the locking mechanism will be able to push the pin upwards but when the plastic lid is used with

its weaker locking mechanism the pin will not be pushed upwards and thus will be able to unlock the deeper locking mechanism.

### **3.2.9 Cassette cover plate sub-assembly.**

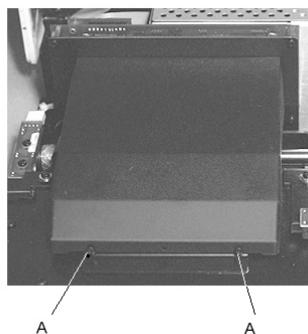
The cassette cover-plate has three sensors mounted which are used to indicate that the cassette is in position for marking. The left and right sensor are touching the front edge of the cassette while the middle sensor should enter a hole in the cassette. There is a special test mode in the firmware that will display the status of the sensors. The test mode and the adjustment of the sensors are described in a section in the diagnostic chapter.

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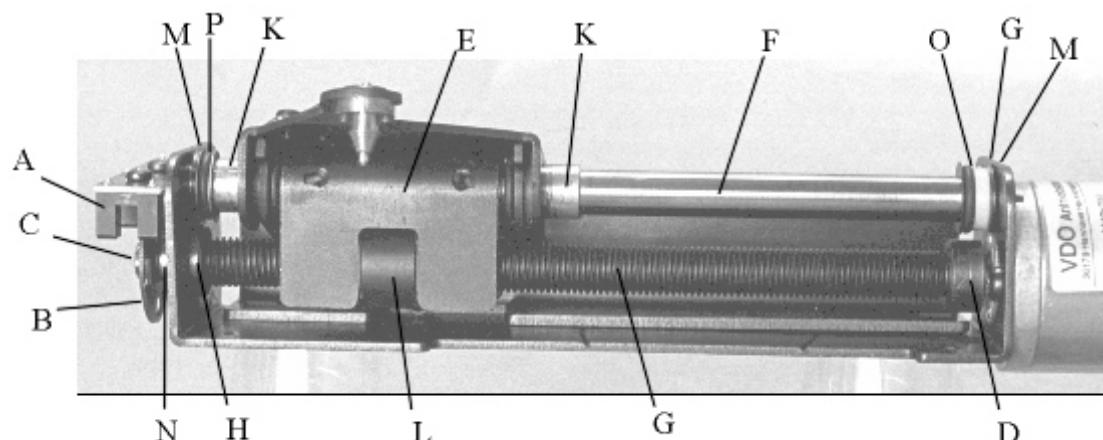
## 4. Disassembly/Assembly

The camera is opened by removing two big screws, one on each side, and then flip the case open by pulling the front of the white case upwards.

To get a better view of the opening mechanism and the exposure unit the upper baffle can be removed by loosening (not removing) the two screws (A) at the front and then pull upwards at the front of the baffle.



### 4.1 The opening mechanism



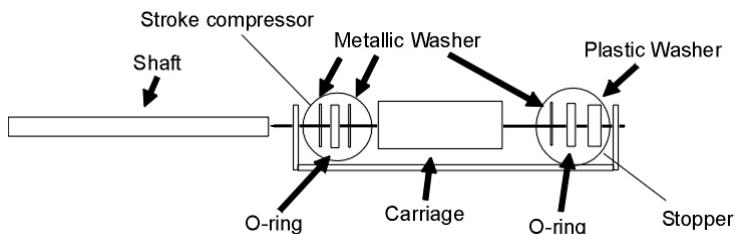
#### 4.1.1 Disassembly

- Remove the two cables at the back of the exposure unit.
- Check the position of the exposure unit. It can be sledded sidewise and it will be easier to put it back if we know where it was before. Put a piece of tape on the bottom plate or measure the distance between the left edge of the bottom plate and the exposure unit.
- Remove the two screws that holds the exposure unit to the bottom plate of the camera.
- Remove the exposure unit by pulling the back of it upwards/slightly backwards and let it fold until the front is released from the holder.
- Check the position of the optical switch board. It can be sledded sidewise and it will be easier to put it back if is known where it was before. Unscrew and remove the optical switch board circuit (A) board to the left of the motor assembly. Let it hang loose in its cables.

- Move the carriage (E) to the right by turning the lead screw so that the ball bearing at the back of the carriage gets free and the carriage later can be lifted right upwards without any hindrance.
- Remove the code disk (B), the washer and the distance at the left end of the lead screw by unscrewing the nut (C) on the lead screw. To do this the lead screw has to be held in place by inserting a socket head cap screwdriver into the screw (D) that holds the lead screw to the motor shaft.
- Remove the two E-rings (M). Note that the right one is fixed with a screw.
- Slide the shaft (F) sidewise and remove the stopper (O) and the stroke compressor (P). Pull the shaft out.
- Now the carriage can be lifted straight upwards and put aside.
- Remove the lead screw (G) by first un-tighten the screw (D) that holds the lead screw to the motor shaft and then loosen the two screws that hold the motor. Separate the motor from the lead screw by pulling the motor to the right. The lead screw can now be removed. NOTE! The ball bearing has a given position and should not be moved unless it is to be exchanged.
- The carriage itself should not be disassembled. The two plain bearings (K) are one-time-only and can not be removed and inserted again.

#### 4.1.2 Assembly

- Slide the lead screw (G) back in the ball bearing (H) and then but the motor back. Push the lead screw (G) over the motor shaft while position the motor. Fix the motor.
- Position the lead screw sideways against the ball bearing and fix it with the socket head cap screw (D). It is important that the ball bearing (H) is at its given position, if it has been moved it has to be adjusted, see point 7 below.
- Put the carriage (E) back over the nut (L) on the lead screw.
- Put the shaft (F) that holds the carriage back. Make sure that the stroke compressor and the stopper are mounted in right order.



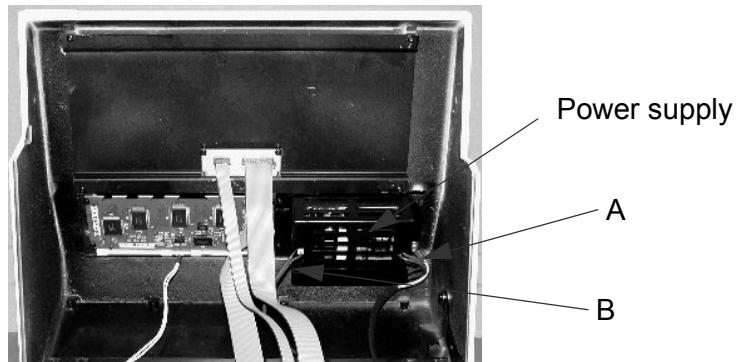
- Put on the E-rings (M) and fix the right E-ring with the screw.
- Put the code disk (B) back. First the 5mm thick distance should be applied, then the code disk and finally the nut. The nut must be secured with Loctite 243 or equivalent.
- The optical switch circuit board (A) is next. It should be fastened with two screws. It need to be calibrated but a good start is if it is put close to its original position. Most often the position can be seen by the marks the screws make in the board. NOTE! It is very important to verify that the sensors goes free from on one hand the ball bearing and the other the code disk. If not, the lead screw must be adjusted. This is done by loosen the socket head cap screw (D) and carefully press the lead screw, including the ball bearing, sideways.

- Put the exposure unit in place. Put it in the position according to point 2 in the disassembly instructions. Its position needs to be calibrated later. If point 2 was ignored make sure that the position is not too far to the left because the carriage may hit the exposure unit during the opening.
- Now everything is in place. Next step is to adjust the optical switch board. Please refer to the chapter about the sensor adjustment in the diagnostic chapter.
- Next step is to adjust the position of the exposure unit. How to do this is described in the Diagnostics chapter.

## 4.2 Replacing the power supply

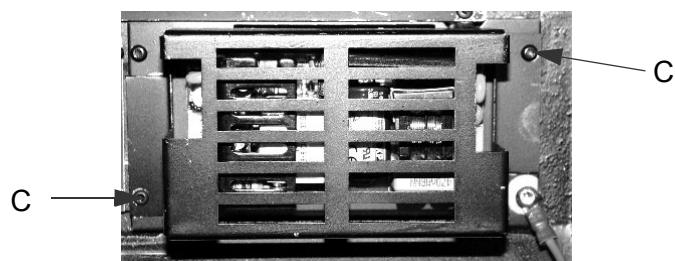
### ! CAUTION

Remove the mains connection. When working on the power supply the mains must not be connected.

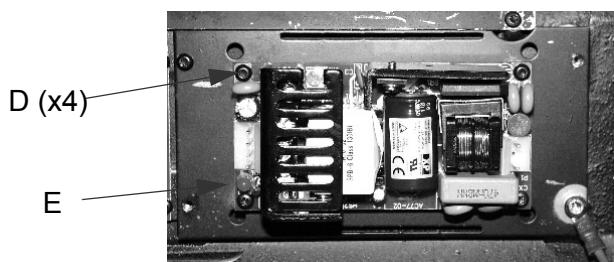


The power supply is located at the right side of the top cover

- Disconnect the connectors 'A' and 'B'.



- Open the top cover of the power supply by removing the two screws 'C'.

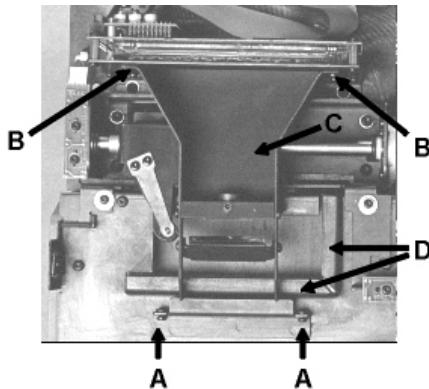


- Remove the four screws 'D' and replace the power supply.

**NOTE!** The two upper screws holding the power supply are grounding connectors. It is important that these screws are correctly tightened.

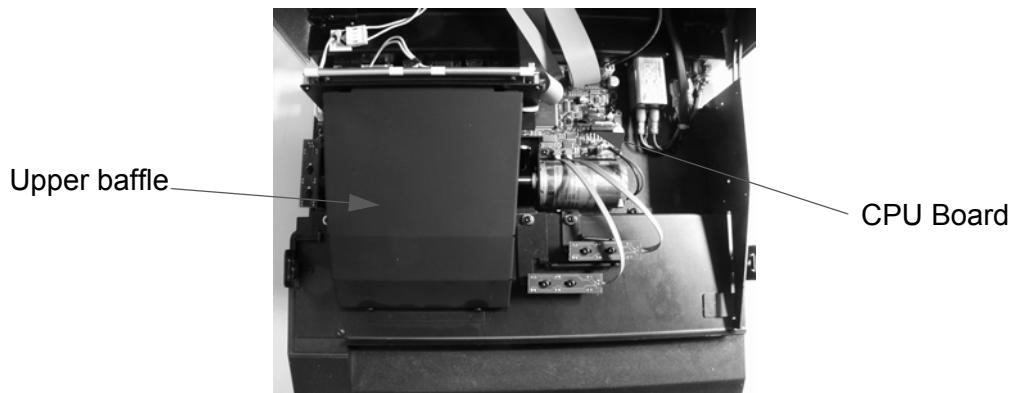
- When the top cover is on its place, connect the two connectors 'A' and 'B' again.
- Power on the system and verify function.  
NOTE! The green LED 'E' indicates 24VDC out.

### 4.3 Replacing the sealing strips



- Open the top of the camera according to the description at the beginning of chapter 3.
- Remove the upper baffle by loosening (not removing) the two screws (A) at the front and then pull upwards at the front of the baffle.
- Remove the cover (C) of the optical unit by loosen the screws (B), two at each side. If the entire exposure unit is removed it must be adjusted after reinstallation, see chapter 4.2. NOTE! The mirror surface should NOT be exposed to any kind of physical contact.
- Remove the sealing strips (D) fixed from below on the cassette cover sheet. Make sure that the surface is clean from old remains.
- Apply the new sealing strips. We recommend that Loctite 406 glue together with Loctite 770 primer is used.
- Reinstall the cover (C). If necessary, clean carefully the display window and the lens using a soft piece of rug and alcohol. NOTE! Do not clean the mirror.
- Put the upper baffle in place and tighten the screws (A).
- Close the top of the camera.
- Done.

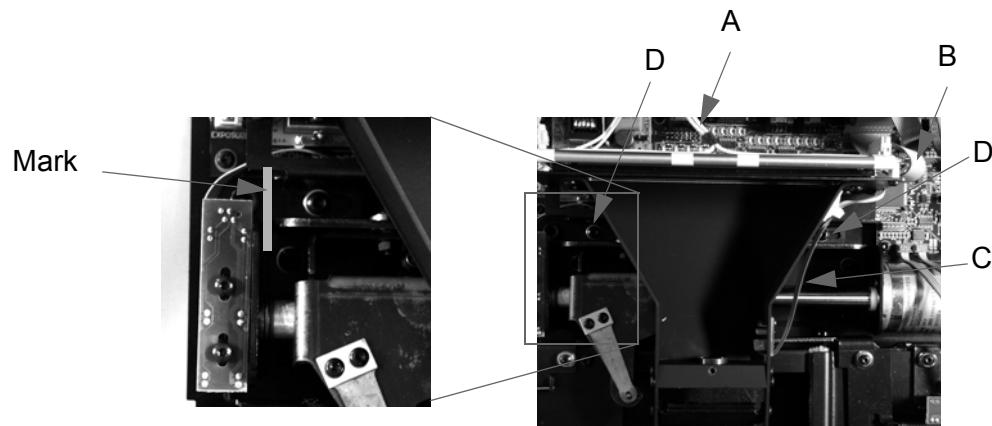
## 4.4 Replacing the Main Board



The CPU board is located inside the unit - rear side of the bottom plate.

If it is possible, it is recommended to save the current set-up in the unit before exchanging the main board. To do so, please refer to Installation and Setup Manual chapter 3.8 'Remote Control'.

- Remove the mains connection.
- Open the top of the camera and remove the upper baffle.
- To be able to exchange the CPU board it is necessary to remove the exposure unit.



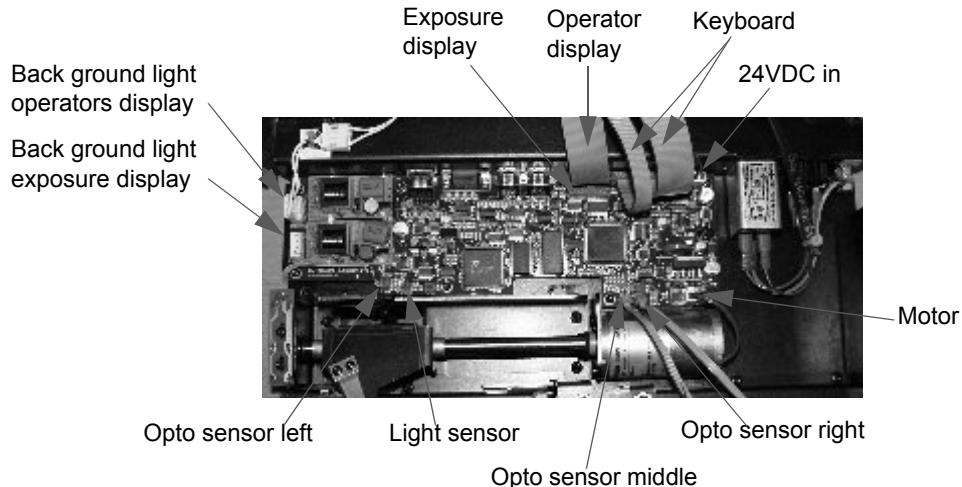
Before doing that, make a mark of the exposure units position using a sharp tool as shown in picture above. This will help you to reposition the unit after the CPU board is replaced.

- Disconnect the two cables 'A' and 'B'.

- Remove the two screws 'D' and gently pull the exposure unit out. Note that cable 'C' is going to the CPU board and has to be disconnected before removing the exposure unit completely.

## ! CAUTION

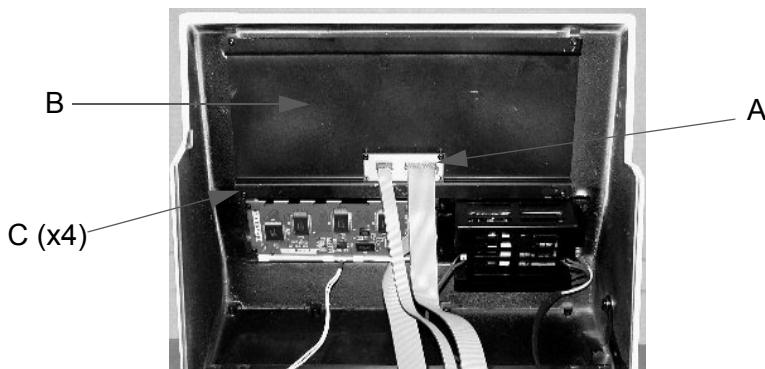
- The MicroMatch connectors (red ones) have a small polarizing pin on left side. Loosen the connector carefully to avoid damage on these pins.



- Replace the CPU board. Eight Torx M3 x 6 screws are holding the board.
- When the new board is installed, make sure all eight screws are tightened and the connectors are properly inserted.
- Reinstall the exposure unit by connecting the light sensor connector as step one.
- Put the exposure unit gently on place and adjust it sidewise according to the mark made.
- Tighten the screws and connect the two connectors 'A' and 'B'.
- Put the upper baffle back and close the cover.
- Power on the unit and verify that actual firmware version is loaded. This is done by pressing SHIFT+F4 from the main window and read the version at the top right corner of the display.
- If a update of the firmware version is required, please refer to Installation and Setup Manual chapter 4 'Upgrading the firmware'.
- Download the previously saved set-up, please refer to Installation and Setup Manual chapter 3.8 'Remote Control'.

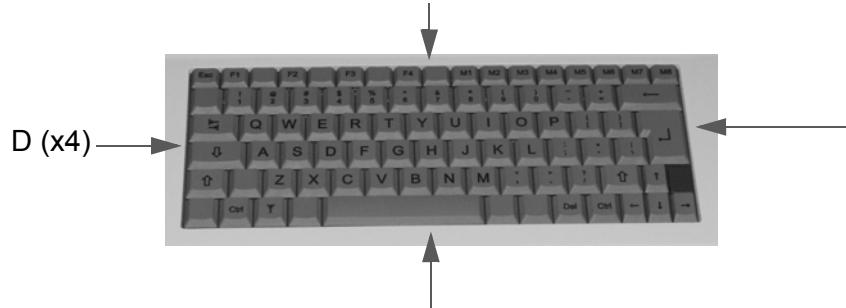
## 4.5 Replacing the Keyboard

- Open the top of the camera.



- Locate the small adapter board 'A' and disconnect the two MicroMatch connectors (red ones). Note that the have a small polarizing pin on left side. Loosen the connector carefully to avoid damage on these pins.
- Disconnect the two flexi strip, coming from the keyboard, by gently pulling them out.
- Remove the keyboard support 'B' which is secured by four screws 'C'.
- Replace the keyboard.

Make sure the keyboard is correct positioned before tighten the screws 'C'. Best way to do this is to verify that there is some space between the edges of the keyboard and the top cover, ref. 'D'.



- Connect all cables and connectors.
- Close the top cover and secure it.

### 4.5.1 Keyboard test

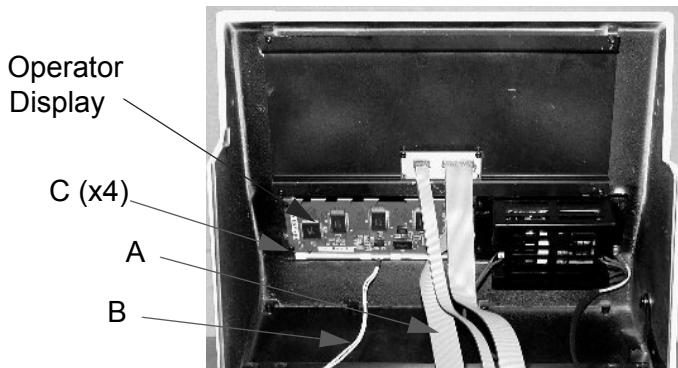
A built in test program can be used for test of the keyboard.

- Hold down the P-key while power on the unit.
- Press Ctrl+T and select Keyboard test by pressing the M1-key, a graphic image of the keyboard appear on the display. Now, pressing down one key will "fill" corresponding position on the graphic image.
- Verify the keyboard by pressing each and one of the keys.

When done, switch the unit off and on again to start it up in normal mode.

## 4.6 Replacing the Operator display

- Power down the Camera before starting this work.
- Open the top of the camera.



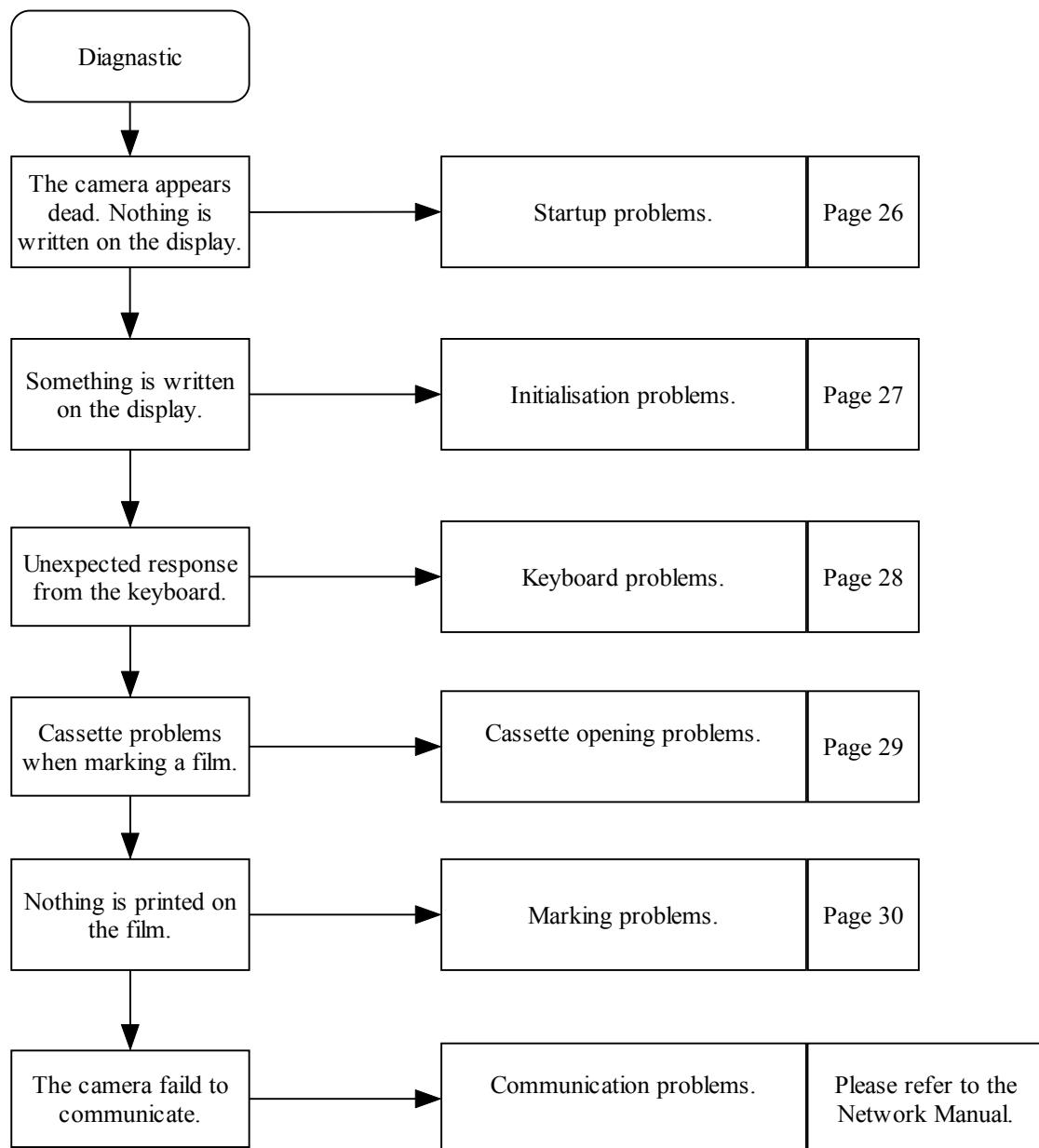
- Locate the operator display.
- Disconnect the data cable 'A' and the back ground light cable 'B'.

### ! CAUTION

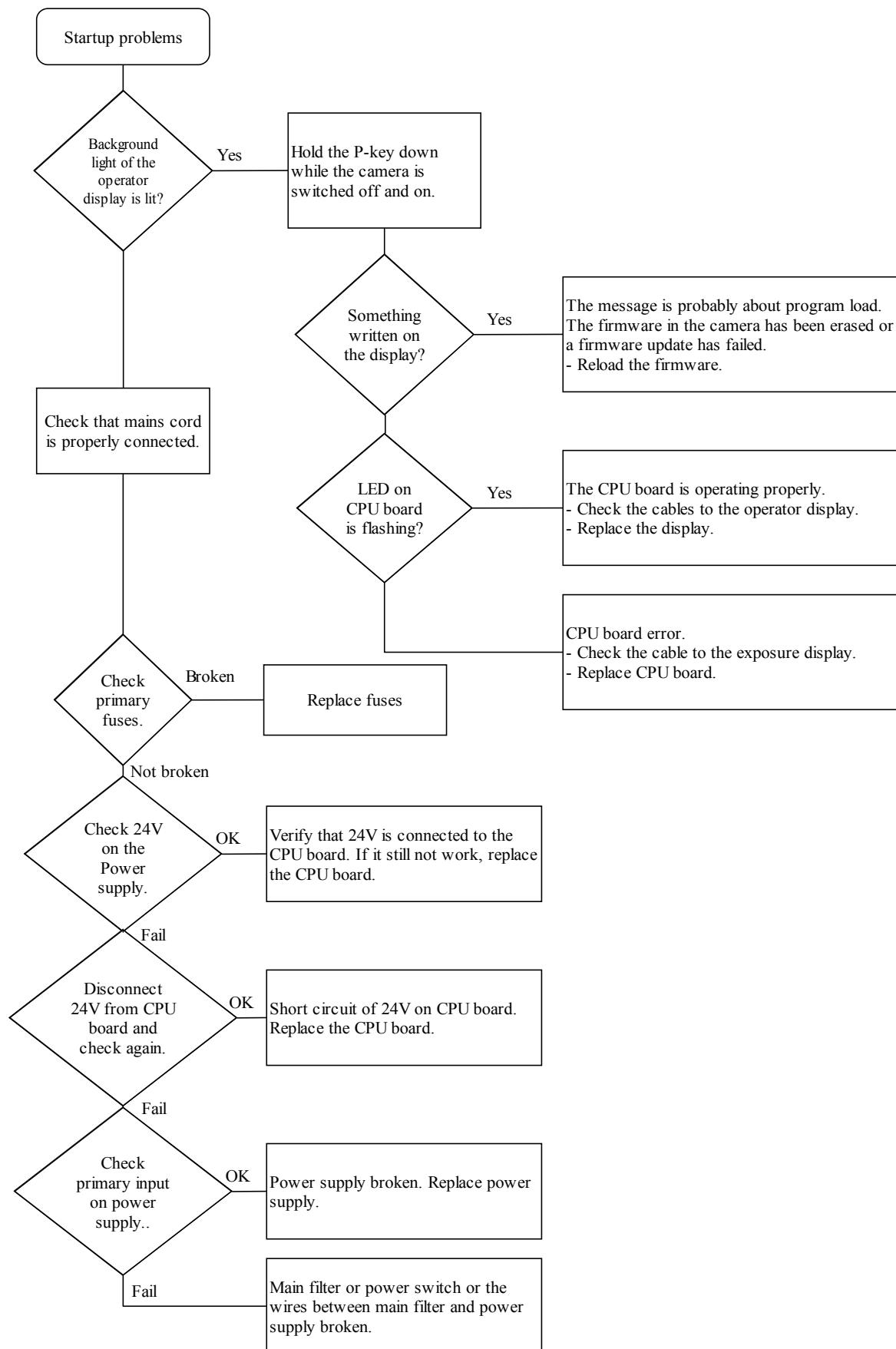
The background light is supplied with high voltage. This voltage is generated by a inverter located on the main board. Make sure the unit is powered down before disconnecting the background light.

- The display is hold by the four screws 'C'. Remove these screws and take out the display.
- Insert the new display and tighten the screws.
- Connect the operator display cable 'A' and the background light cable 'B'.
- Close the cover and power up the unit.
- Verify function.

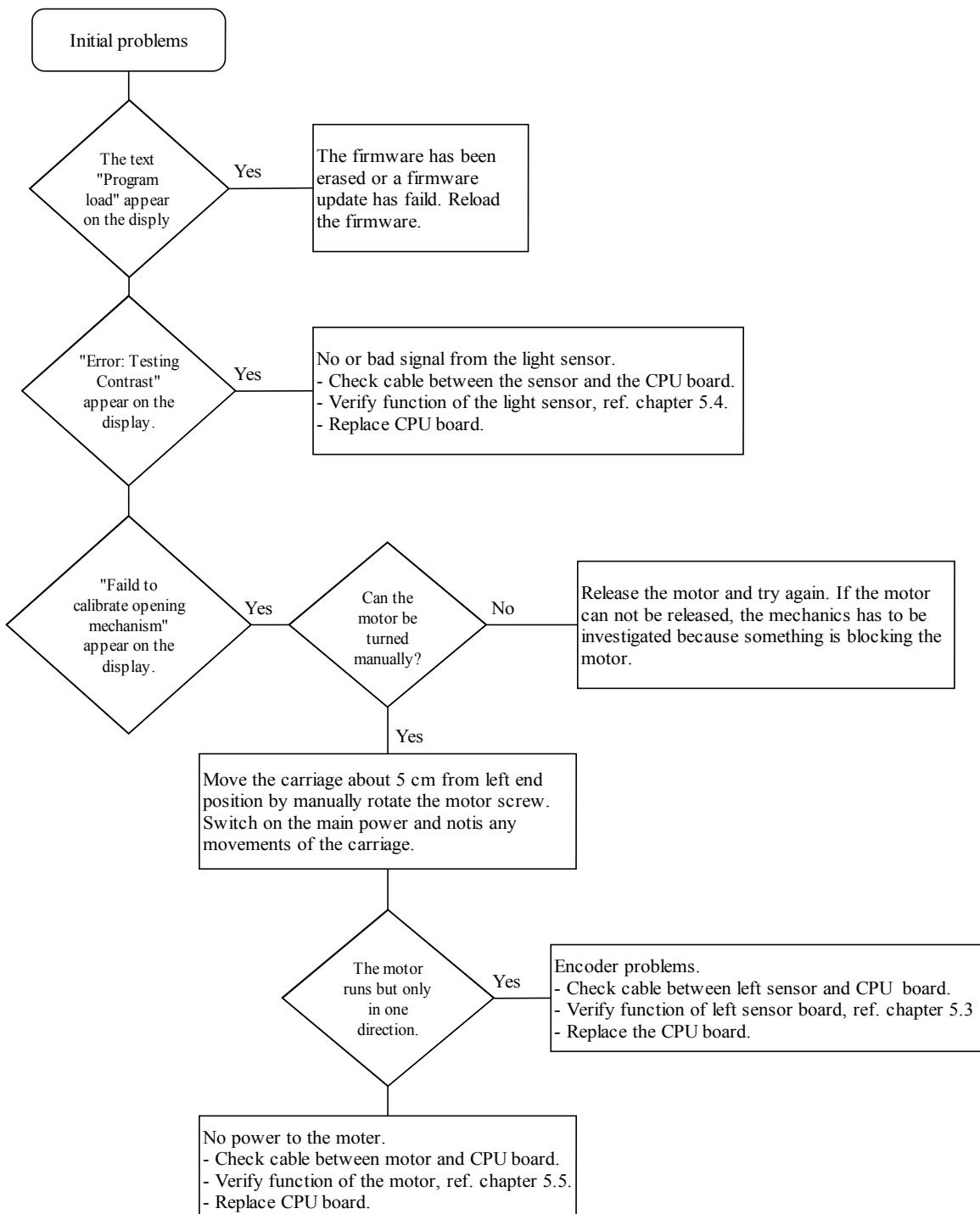
## 5. Diagnostic



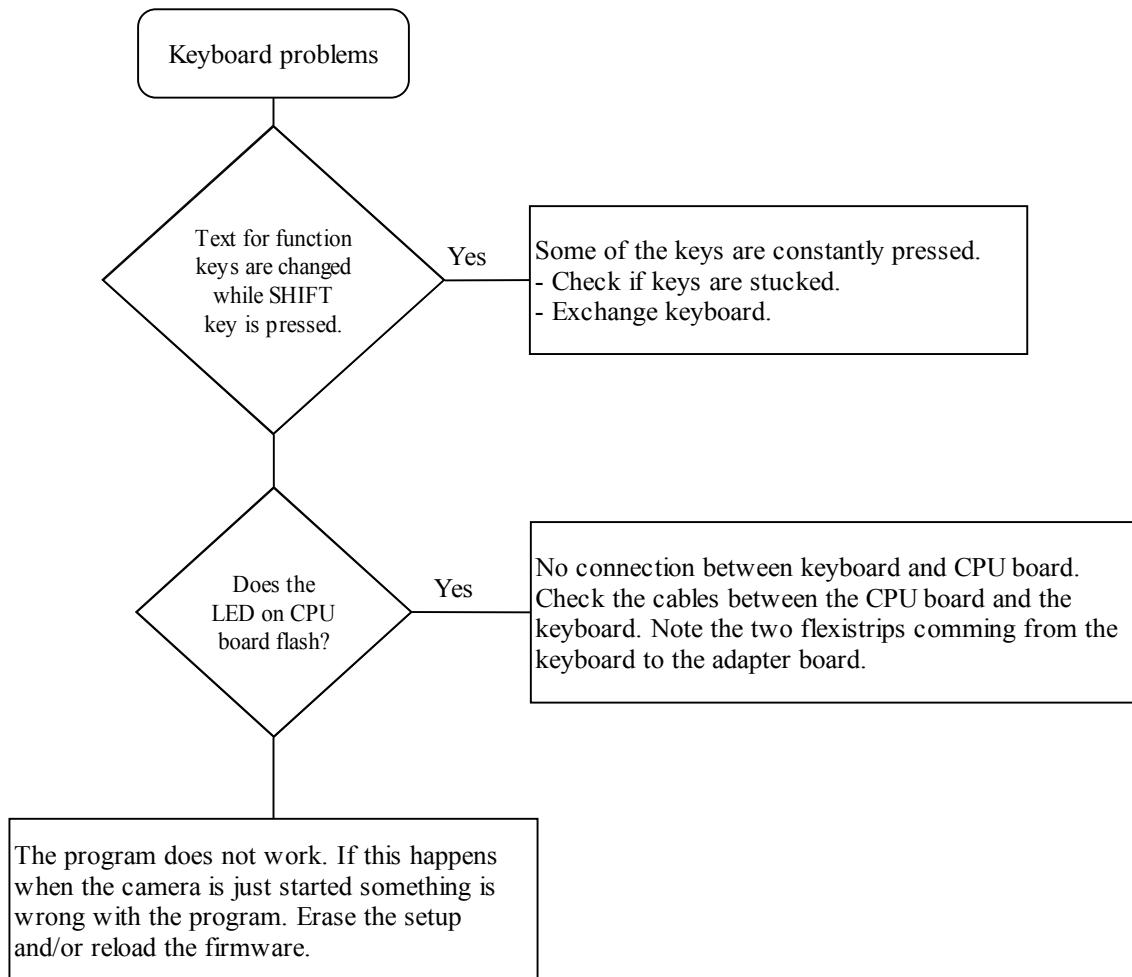
## Startup problems



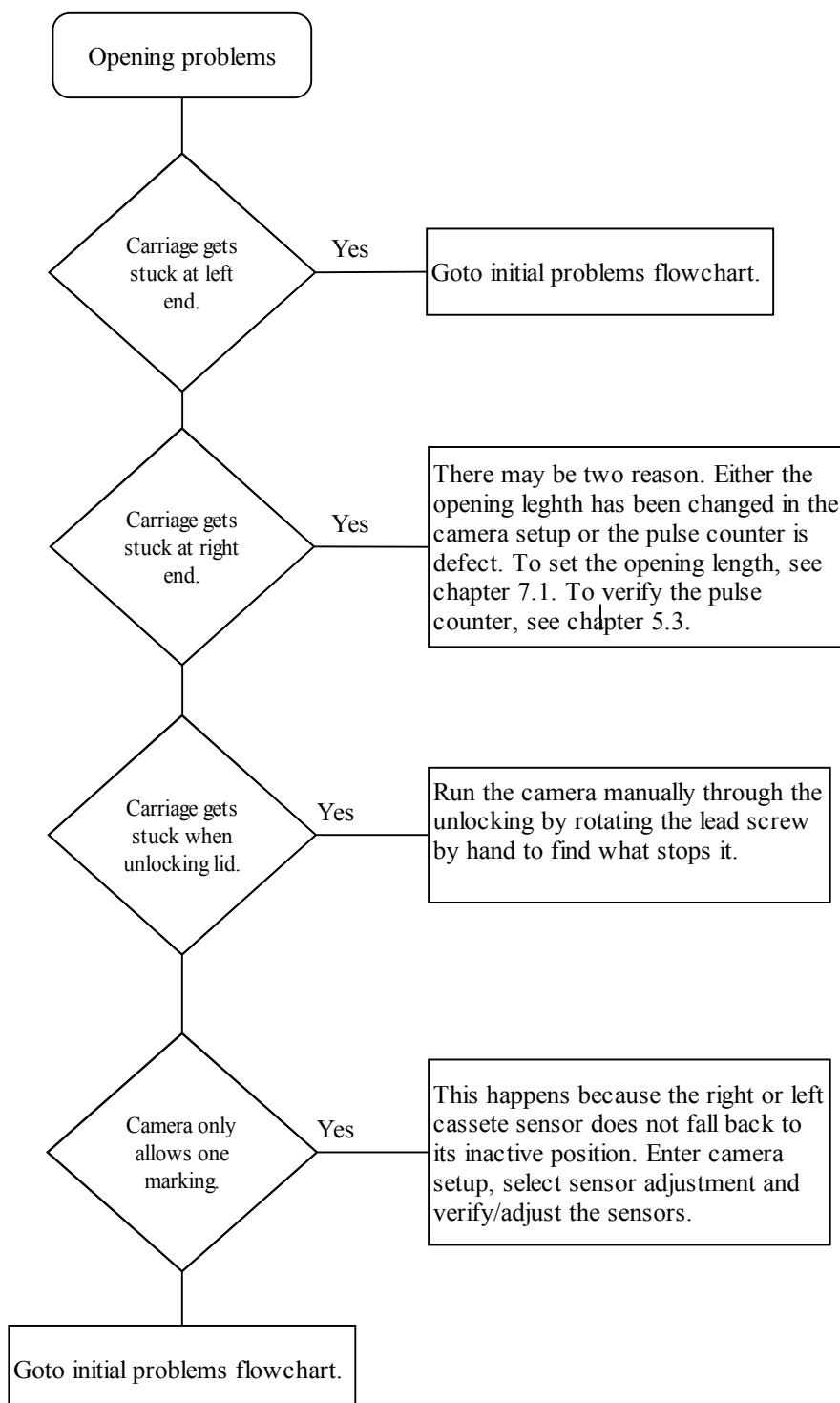
## Initialiation problem



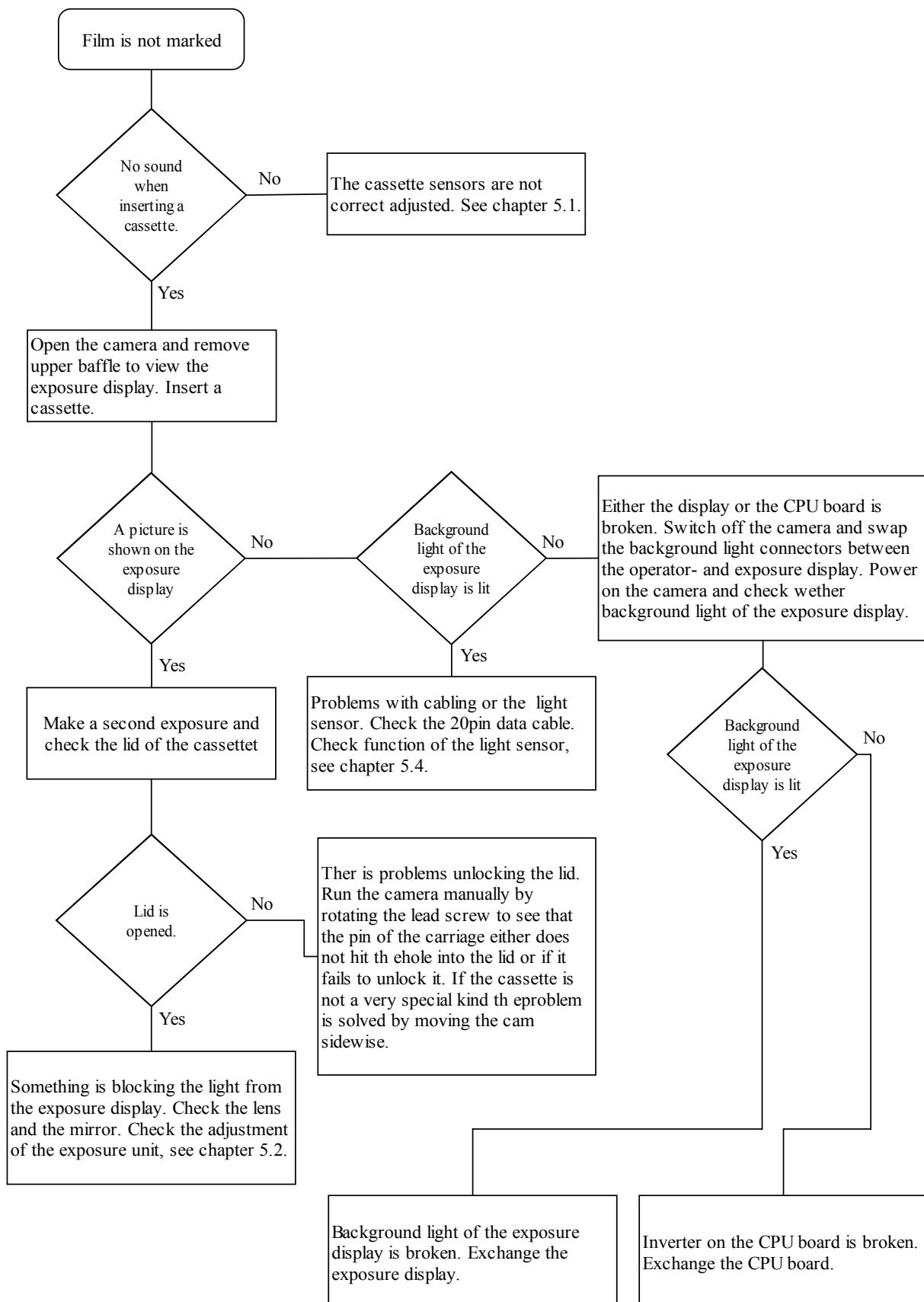
## Keyboard problem



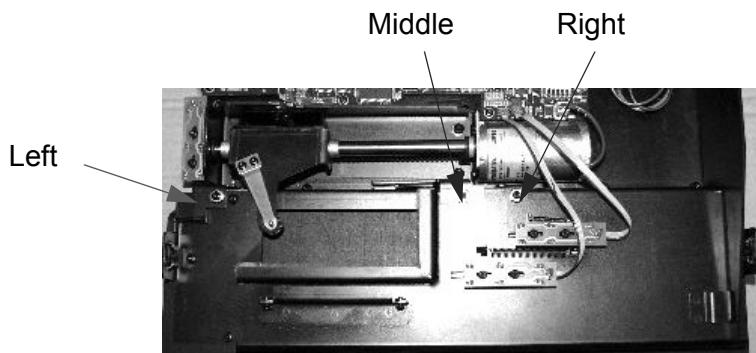
## Opening problem



## Marking problems



## 5.1 Sensor adjustment



The left and right sensors sense the front of the cassette. When the cassette is inserted well enough the opening cycle may start. The middle sensor is a pin that should enter a hole in the front side of the cassette. If the cassette is not well pushed towards the left side of the opening of the cassette the pin will hit beside the hole and the middle sensor will be pushed by the cassette and by detecting this the camera knows that the cassette is not properly inserted.

To adjust the sensors, enter the set-up mode of the camera. Select Sensor adjustment. Here a picture is shown showing the status of the three sensors. Note that this picture is also shown on the exposure display so if the baffle over the exposure unit is removed there is no need to look at the operator display to do the adjustment.

When no cassette is inserted all sensors should show OFF. When a cassette is inserted in marking position the left and right sensor should show ON and the middle sensor should show OFF.

Adjusting a sensor is made by loosening the two screws that holds the corresponding optical switch board and then slide the board until it switches between ON and OFF in the appropriate position.

The left sensor should switch to ON when there is about 1.5 mm until the cassette is fully inserted.

The right sensor should switch to ON when there is about 1.5 mm until the cassette is fully inserted, but this adjustment is not as critical as the left sensor. What is critical is that when both the left and right sensor are both switching to on the hole of the lid in the cassette must be in a position where the pin of the opening carriage will enter the hole. This means that the setting of the left sensor is quite critical. 1 mm here will mean 1 mm in the position of the hole. The right sensor is not so critical, 1 mm here will mean about 1/10 of a mm in the position of the hole.

The middle sensor should be adjusted to switch to ON in the middle of its movement. Take a cassette and insert it but keep it a few centimeters from the left side of the cassette bed so the pin of the middle sensor does not hit the hole in the cassette. Move the cassette in and out to see how much the sensor moves. Find the middle of this movement, hold the cassette there and adjust the optical switch board so it switches at this position.

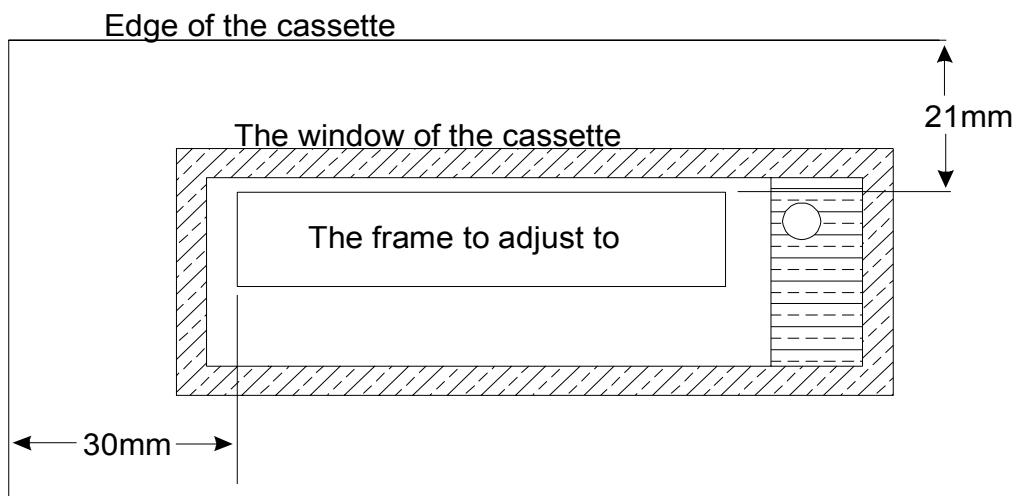
When the two screws holding an optical switch board has been tightened the sensor should be checked once more as the board may move when the screws are tightened.

## 5.2 Adjusting the exposure unit

This adjustment must be made if the exposure unit has been moved. First the lens has to be adjusted. By moving the lens backward or forward the size of the picture can be changed. This adjustment only has to be made if the lens has been moved in its holder. Next is to adjust the mirror and the position of the exposure unit sidewise.

As a help a frame drawn on a paper is needed. This frame should be inserted in an empty cassette and the camera will then be made to present a corresponding frame on the exposure display which will be projected on the paper in the cassette using a special test mode of the camera. The size of the projected frame should then be adjusted to match the frame on the paper.

The size of the frame should be 13mm high and 64mm. You may very well make a copy of the illustration below. Just remember to check that the size after copying is still 13 by 64 mm.



- Insert the paper with the frame into the cassette as illustrated above.
- Take the camera somewhere where there is not too much light.
- Open the camera and remove the baffle that covers the exposure unit by loosening (not removing) the two screws in the front of the baffle. If the exposure unit needs to be adjusted sidewise the two screws that hold the exposure unit to the base plate should be un-tightened.

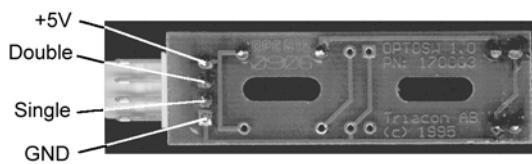
**! WARNING!** By doing this you will also remove the cover that protects you from the moving carriage when the camera is operated!

- Enter set-up mode/test functions. Select test picture Frame C1N.
- Insert the cassette. Press the Sift+F1/Adjust. The camera will open the cassette and keep it open and display the test picture.
- Now make the frame displayed on the exposure display show on the paper in the cassette by tilting the mirror and maybe moving the lens.
- Next adjust the lens so that the size of the frame projected on the paper fits within the frame on the paper. The lines of the projected frame is probably wider than the line on the paper. They should be on or within but not outside the lines on the paper. Adjust the position sidewise by moving the entire exposure unit if necessary. If the picture is trapezoid (sides are not parallel) can be corrected by moving the mirror backwards or forwards in the holes it is mounted in. Just loosen the screws and slide it. If the upper and

lower lines are not parallel it is because the left and right side of the mirror are not adjusted properly relative to each other.

- When the projected frame is rectangular and the size is adjusted to the frame on the paper, tighten the screws that holds the exposure unit to the base plate, tighten the screws that holds the mirror, carefully as the mirror may tilt when doing so. Check that the adjustment is still OK.
- Press Shift+F1/Adjust again to close the open cassette and to switch the exposure display off. Put the baffle back and tighten the screws that holds it. Close the cover of the camera and mount the two screws that holds the cover.
- Make an exposure to make sure that everything is OK.

### 5.3 Checking if an optical switch board works

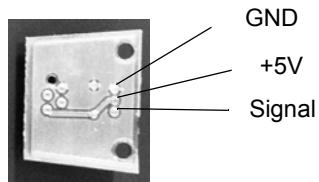


Three optical switch boards are used in the camera. Two have one optical switch mounted and one have two optical switch. They are all used for the cassette sensor described in the previous chapter but the board with two optical switch are also used for the pulse counter. The pins in the connector of the optical switch board are used at follows.

The pin marked single are on all three optical switch boards used to detect the status of the sensors while the pin marked double is used for the pulse counter detector.

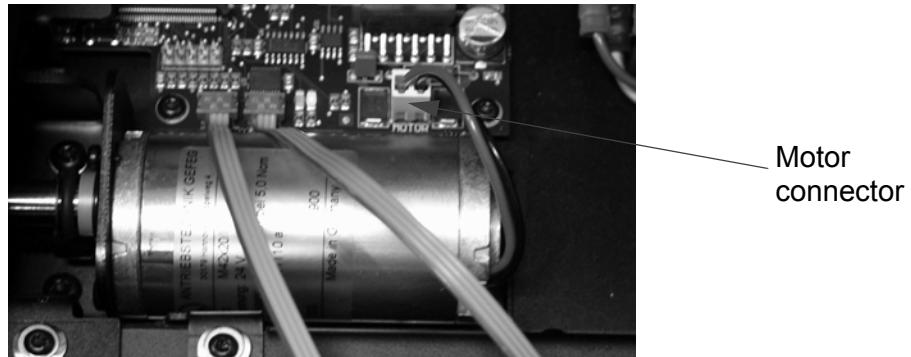
When nothing is inserted in the gap of the optical switch the voltage between GND and the output (Double or single) should be less then 0.5V. When something is inserted breaking the light the voltage should be more then 3V. Note that an ordinary paper will not break the light. The IR light will go through the paper. Best to use is a piece of metal, for example a piece of aluminum foil. Also, check the plastic cover of the optic sensors that it is not broken.

### 5.4 Checking if the light sensor works



Use a multimeter to measure the voltage between "Signal" and "GND". The signal voltage should be about 1 - 2V in normal daylight. Cover the sensor and the voltage should drop and if the light intensity increases the voltage should rise.

## 5.5 Checking if a motor works



This check is performed by simply connect an external power supply to the motor.

- Power down the camera and disconnect the motor connector.
- Move the carriage to its center position about 60 cm to the right.

**!** **WARNING!** To apply external voltage to the motor will cause an immediate reaction. To avoid mechanical damages, use a 12VDC/1A supply.

- Connect the supply to the motor and switch it on for just a few seconds.
- If the motor is OK the carriage should move a bit.

## 6. Maintenance

When the camera is operated in a dusty environment it may be necessary to open the camera regularly to clean out the dust.

Cleaning the outside of the camera may be done with a piece of cloth and mild soap.

NOTE! Never use strong chemicals, including alcohol or abrasive to clean the outside of the camera.

### 6.1 Lubrication

No lubrication is needed inside the unit. All moving parts is self lubricated.

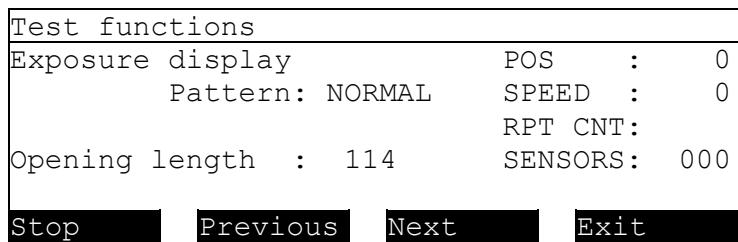
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## 7. Built in diagnostic software

The Network ID Camera has built in test functions for cassette sensor adjustment and for testing and adjusting the exposure display. The sensor adjust function is described in the Sensor adjustment chapter and will not be repeated here.

### 7.1 Test functions

The test function is entered by entering the Set-up mode and then selecting Test function. The following window will appear:



Press shift-key to enable the following functions.



All these function have been put as shifted function keys since they will cause the camera to operate the motor causing a possible danger for the person operating the camera if the cover is open. Putting them as shifted function keys means that two keys need to be pressed to start the operation.

#### Function keys

The function keys are used as follows:

Stop	Stop the motor.
Previous	Select the previous alternative when editing a menu, like the exposure display pattern selection shown in the picture above.
Next	Select the next alternative when editing a menu.
Exit	Close the test function window.
Adjust	Adjust the exposure display. Pressing this key will cause the camera to open a cassette inserted and keep it open until the key is pressed once more. The exposure display will also be switched on. This is very helpful when the picture projected on the film in the cassette needs to be adjusted. See also the Adjusting the exposure unit chapter. Note that the opening is performed regardless of the status of the cassette sensors, that is with or without a cassette inserted.
Open	Runs an opening cycle exactly as when making an exposure. NOTE! The cassette sensors must be activated, that is a cassette must be inserted.
Repeat	Runs an opening cycle every 2 seconds. NOTE! The cassette sensors must be activated, that is a cassette must be inserted. The repeat function is terminated either by pressing the EXIT key or by pressing the Repeat key once more.

Calibrate	Runs a calibration. The camera is not able to sense when the carriage is in its home position. Instead a calibration cycle is run each time the camera is switched on and at the end of each opening cycle. The calibration cycle means that the motor is run slowly leftwards until the movement is blocked because the carriage hits the left end stop. Then a short movement right followed by yet a left movement (slower this time) until the left end stop is hit again. If the position is the same (with some margins) both time the position is set to 0 and the motor unit is considered calibrated. This operation has to be performed either by using this function or by switching the camera off and on again each time the motor is rotated manually since the camera is not able to keep track of the position. It counts pulses but it is not able to find if the carriage moves left or right.
Left arrow	The speed of the motor can be set in step of 8 by pressing the left or right arrow keys. Positive speeds are cause movements to the right, negative to the left. The left arrow key will subtract 8 from the speed.
Right arrow	The speed of the motor can be set in step of 8 by pressing the left or right arrow keys. Positive speeds are cause movements to the right, negative to the left. The left arrow key will add 8 to the speed.

### Exposure display pattern

Here different patterns that will be displayed on the exposure display can be selected.

Normal	Display the content of the operator display. Note that the exposure display is not switched on until either any of the opening functions described above is performed or until the selection is changed to something else and then back again.
FRAME C1	Display a three pixel wide frame matching the size of a picture when a cassette with the C1 window is used. This means that the entire area of the exposure display is used.
FRAME C1N	Display a three pixel wide frame matching the size of a picture when a cassette with the C1N window is used. This means that the entire area of the exposure display except for 16 lines at the top is used.
Opening length.	Here the length of the lid can be set. Normally this is 114 but if a cassette with a lid shorter then normal is used, the value can be changed here.

### Information on the display

The following information is displayed on the display.

POS	Shows the position of the carriage. Note that the camera is not able to determine the direction of a movement if the motor is run by hand. The pulse count will change but it will increase or decrease (depending on the direction of the last motor movement) regardless of which direction the motor is moved.
SPEED	Tells which speed the motor is running. Positive speed means movement to the right, negative speeds movement to the left. The value is updated once a second.
RPT CNT	Counts the number of opening cycles run by the repeat function of the camera.
SENSORS	Shows the status of the three cassette sensors. A 0 means sensor not activated, 1 means sensor activated. Left digit is left sensor and so on. Updated once a second. For adjustment of the sensors the Sensor adjustment window is recommended.

## 7.2 Serial Analyser

See the Network Installation Manual for information.

## 7.3 System logger

The system logger is a 64 record database where the firmware can report errors and abnormal situations which are not reported to the operator or which may be useful for technicians to check afterwards. The logger is never erased unless the "Erase" button is pressed. Together with the message, date- and timestamp is stored.

The format of a record is "No:Date Time Error".

No Index between 00 - 63.

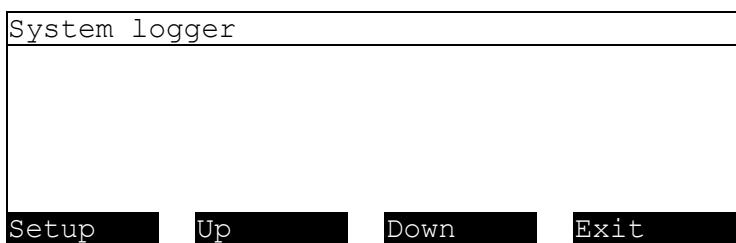
Date Date when the error occurred.

Time Time when the error occurred.

Error The error message in plain text.

ex. "00:100499 08:45 Failed to open lid. Pos = 20".

The errors are divided into four groups; Miscellaneous-, Communication-, Mechanical and Critical errors. The first three can be set to Record/Ignored. The last one is always active because it handle internal critical errors such as flash memory reset and checksum error in set-up memory.



Press shift-key to enable the following functions.



The soft-keys are used as follow.

Setup Enter the system logger set-up. Possible settings are enable/disable of recording of Miscellaneous-, Communication- and Mechanical errors. If, for example, a communication problem which occur rarely shall be traced it can be a good idea to switch the other records of to avoid that the communication records gets overwritten if the database gets full. This because of the limited number of records in the list. NOTE! Recording of critical errors can not be switch of.

Up Scroll the window up.

Down Scroll the window down.

Exit Exit the system logger.

Erase Clear all error messages listed in the system logger. NOTE! If the list is erased, the data can not be re-created.

Left Scroll the window to the left.

Right Scroll the window to the right.

All event View all records. This can be used if the database is partly corrupt and you want to view all records even the records which the camera consider being after end mark. Empty records is marked with lines.

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Triacon Scientific AB  
Betselgatan 6  
213 77 Malmö  
Sweden

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